IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of:

Yu Jen Chen, et al.

Serial No.: 10/810,926

Filed: March 25, 2004

For: A Method and System for

Alerting An Entity to Design Changes Impacting the

Manufacture of a Semiconductor §

Device in a Virtual FAB

Environment

Docket No.: 2003-0449/24061.103

Examiner:

Siek, Vuthe

Art Unit:

2825

Conf. No.

1917

DECLARATION UNDER 37 C.F.R. \$1.131

Š

We, Yu Jen Chen and Jiann-Yeh Ou, being duly sworn, depose and say:

- 1. That we are the inventors for the above-identified Patent Application;
- 2. That we have reviewed the claims of this Application;
- 3. That we conceived in Taiwan (Republic of China), a member of the World Trade Organization, prior to June 30, 2003, the earliest effective date of the cited United States Pre-Grant Publication No. 2005/0125763, the invention as set forth in the above-captioned application, and in particular, a method of manufacturing a semiconductor device comprising generating, by a first entity, design information useable for designing semiconductor devices, supplying, by the first entity, design information to a second entity, designing, by the second entity, a semiconductor device using the design information, and alerting the second entity by the first entity if there is a change in the design information that would impact the manufacture of the semiconductor device.
- 4. Attached as Exhibited A is a copy of our "TSMC Invention Disclosure" that was prepared and provided to our employer prior to June 30, 2003 evidencing conception of the above-captioned invention.
- 5. That from before June 30, 2003 to March 25, 2004, the filing date of the abovecaptioned application, we diligently worked toward reducing the claimed invention to practice

Serial No. 10/810,926 Declaration under 37 C.F.R. §1.131

Docket No. 2003-0449/24061.103 Customer No. 42717

and worked with patent counsel in the preparation of a patent application for the claimed invention. At no time did we abandon, suppress, or conceal the invention claimed in the abovecaptioned application.

That the statements made herein are of our own knowledge and are true and made on information and belief that are believed to be true.

We acknowledge that any willful false statements and the like made herein are punishable by fine or imprisonment, or both, and may jeopardize the validity of the application or any patent issuing thereon.

Dated Sept. 18, 2006

Dated: 5-17.18.2066





SECURITY B

JCHENE/TSMC on

Status: 待智財處處理

Current Processer: 023437: 施冠妙

Disclosu No. :		-0449	Receive		E	Process priority
for inventors from outside of tsmc, please use "X66" instead.	Full name of English, the same as passport.	of inventor (s) Chinese	(Dept	Dept. Code	Ext. No	E-mail Address
008922	1 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m 1 m	陳於人	DCWAP	502A	703-601 2	YJCHENE@tsmc.com.tw
019696	Jiann-Yeh Ou	歐建業	DCWAP	502A	703-829 1	JYOU@tsmc.com.tw
		·				

- Title of invention (English only)
 - A method of auto-finding & notifying inconsistency of building blocks & associated technology related substance of chip level during logic & physical design phase
- Related disclosure(s) -
- Assignee ~ 本發明屬於1.TSMC 或 2.由TSMC與其他公司共同擁有
 1. TSMC 2. TSMC &
- Laboratory Notebook / 研究紀錄簿相關資訊

This idea was shown on page of the laboratory notebook with serial number of (such as

Please attach a copy of the related pages.

- Invention related information / 本發明相關資訊 -
 - 1. Will this invention be disclosed, published, utilized, commercialized or implemented in Customer's product(s)?

 ● No. ○ Yes. When (ex. 2003/04/24) 請務必塡寫本發明之預定論文發表或展覽或販賣或實施於
 - 2. Other special request:

Classification - (Multiple choices are	e possible / 以下 1 至 4 項可多選)		
1. Where will the invention be used (Others)	1/本發明的潛在使用者:		
✓ At TSMC✓ Unknow	e e e e e e e e e e e e e e e e e e e		
Probably will not be used			
Used by most IC companies			
下請選擇 others):	適用於(應用於一般技術請選擇 General, 13um □ 65nm □ Unknown 0nm □ Others	0.25um 以上或 65nm 以	
3. Technology / 本發明應用在 (應用於	《一般技術讀選擇 General, 無法歸類請達	報響 others):	
🖂 All Technology 🔲 Image s	sensor 🔲 Mixed-Signal/RF 🗌 SiG	e	
☐ DRAM ☐ Logic	☐ MRAM ☐ SRA	· · ·	
☐ Embedded ☐ MEMS	□ NVM □ Oth	ers	
4. Field of invention / 本發明的技術領 ☐ Device ☐	🗌 Equipment/Litho/Mask 💢 Mod		oftware
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- References similar to the invention / 與本發明相關的論文及/或專利 (Please search for related patents on USPTO website / www.uspto.gov)
 - 1. keyword(s) used / 專利查詢所使用的關鍵字: inconsistency detect, discrepancy detect
 - 2. Related patent number(s) / 相關的專利號碼:
 - 3.Related Non-Patent article(s) and/or product(s) / 其他相關的論文名稱或產品型號:
- Old method(s) or product(s) for performing the purpose of this invention / 目前方法簡介 (English only) prepare a check list and then manually & periodically search the related information to check by few persons
- Problems or disadvantages faced by old method(s) or product(s) / 目前方法所面臨的問題及缺點 (English only)
 - 1. too big efforts to check (to customer)
 - 2. accuracy depends on how often to start the check (to customer)
 - 3. no way to know more information about application of customer's design (to TSMC)
 - 4. few revision messages not tied to a specific customer product or design and to get clear attention (to TSMC)
 - 5. could not effectively help TSMC to get related evidence to manager library/IP.vendors.... reaction
- General purpose of this invention / 發明目的 (English only) -
 - provide customer-centric service to the product level
 proactive notification if inconsistency detected

 - 3. via design profiles (without violating customer privacy) collected, more application oriented.

2004 25 October

- knowledge could be built in TSMC
 4: leverage customer force to manage library/IP vendors to have their product compliant to the latest technology
- 5. a pragmatic scheme to build the link between foundry library/Ip vendor customer design
- Advantages of this invention / 本發明的好處或優點 (English only)
 - 1. proactive to check what impact on designs as soon as a documentation available
 - 2. automatic notification
 - 3. entry & maintaining efforts from VIP customers (not by TSMC)
 - 4. experience sharing for technology promotion and junior or less experience TSMC staffs (FAE, CAE, R&D) also could be educated by profiles
 - 5. profiles could be expanded as sort of KM to application domain
 - 6. give the major & early proceedings' message prior to changes made and avoid the surprise of last minute change
 - 7. library/IP vendors are also be pushed to update by explicit customers' usage
 - 8. evidence of library/IP adopted by customers to manage vendors
- Points of this invention thought to be novel, list by items. Please identify which elements/steps are must and which elements/steps are optional / 請逐項列舉爲達成發明目的所使用的新方法或手段, 即, 本發明與目前方法的主要不同處, 並請指出必要及非必要元件 (English only)
 - 1. a design profile created for customer (must, scope of find&check)
 - 2. a pool to store building blocks (must, preset the schema)
 - 3. a pool to store technology related stuffs -- documentation (must, preset the schema)
 - 4. implementation WIP of chip (must, preset the schema)
 - rule-based intelligent auto-finder to figure out the inconsistency (must, to find the inconsistent parts)
 - a mechanism to share information (must)
 - 7. a notification subsystem (must)
 - 8. early warning scheme (must)
- Detailed description of this invention / 發明的詳細敘述,至少需包括一最好的實施例,及/或其他適用於 本發明的範例 (English only) refer to attachment

Other embodiments/methods/apparatus can be used to achieve the purpose of your invention by a potential infringer./其他可實施本發明目的的手段?或其他可迴避本發明的範例及做法? manually approach



Attachments / 固形請用附加檔: patent AFN on customer design profile

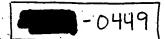


e la company	SIGNATURE OF WITNESS	DATE	SIGNATURE OF WITNESS	DATE
WITNESS: THE TWO WITNESSES WHOSE SIGNATURES APPEAR BELOW HAVE READ AND UNDERSTOOD THIS ENTIRE INVENTION DISCLOSURE.	第4		是多	3

DISCLOSURE SUBMITTED BY			
INVENTORS' EMPNO	INVENTORS' NAME	INVENTOR'S SIGNATURE	DATE
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Processing Log:





A method of auto-finding & notifying inconsistency of building blocks & associated technology related substance of chip level during logic & physical design phase via a design profile

YJ Chen & JY Ou

Design Service





Advantages

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- provide customer-centric service to the product level
- proactive to check what impact on designs as soon as a documentation available
- automatic notification
- experience sharing for technology promotion and junior or less experience TSMC staffs (FAE, CAE, R&D) also could be educated by profiles
- profiles could be expanded as sort of KM to application domain
- give the major & early proceedings' message prior to changes made and avoid the surprise of last minute change
- library/IP vendors are also be pushed to update by explicit customers' usage
- evidence of library/IP adopted by customers to manage vendors

Design Service





Model of chip design

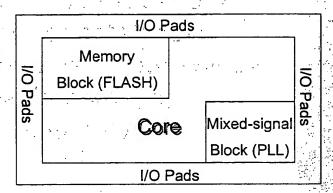
-- view of building blocks & technical stuffs

Building blocks (example)

IO Pad, PLL, embFLASH core logic cell, etc

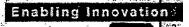
Technology related substance (example)

DRM/DRC for blocks & chip level
Layer definition for bocks & chip level
Spice/LVS for blocks & chip level
Definition of device formation
RC extraction
etc



IC design is to integrate those components on the chip level.

Those must be derived from exactly consistent technology related substance and then the integrated chip must be verified by the same substance





Background

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- -- current barriers to <u>logic & physical design</u> due to inefficiently get the up-to-day info
- Today a design needs about 4 ~ 12 months to tape out from logic implementation done.
- At different stage, designer need various foundry documentations such DRC/DRC, SPICE/LVS, etc (so called technology related stuffs) and some building blocks (library or IP) either from in-house or external vendors
- Those building blocks also are built upon the foundry documentations and those blocks usually have to implemented prior to product chip making
- It is very troublesome & dangerous if something changed. The related building blocks and chip both needed to re-spin the work fully or partially to compliant to the new
- Usually, designers got the foundry specific documents through their internal foundry manager or passive doc acquisition channels. The changes are not obvious to them, only get piece by piece, know at the last minute.

Design Service

Enabling Innovation

Enabling Innovation



Design

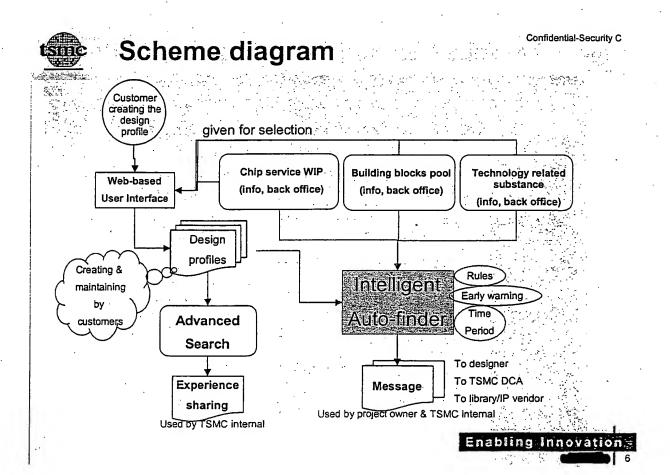
Service

Solution - proactive manage consonance

-- example : Design Rule → building blocks → full chip

know what foundry technology related substance used in a specific design Know what building blocks & associated technology related I/O Pads substance used 🕟 Memory Notify if inconsistency found 5 ■ // Technology related substance : Block (FLASH) **Building blocks** Pads Proactive give the major & early proceedings' message prior to Mixed-signa changes made by foundry Block (PL I/O Pads ⇒ via design profile to manage tape-out required consonance in a design Means to be checked

bye one Design Rule

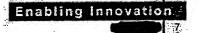




Key features of auto-finder

- Rule-based find & check
- Building blocks & associated technology related substance on the chip level configurable via a design profile
- Give the major & early proceedings' message prior to changes made
- Proactive Notification

Design Service





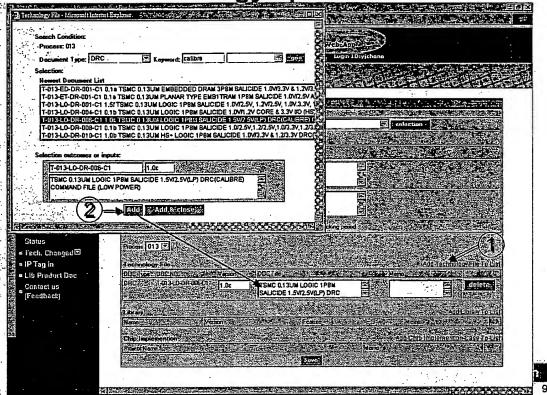
Template to build the design profile

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Online Compiler	Company Name ((selection)
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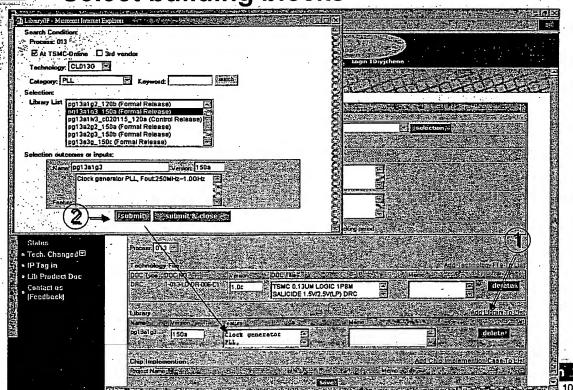
Select technology-specific tech file

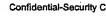


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Select building blocks

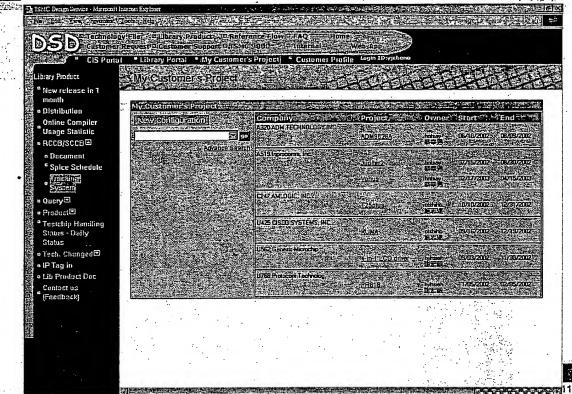
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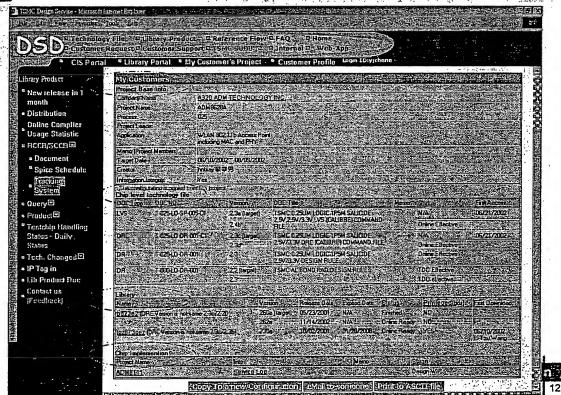




List of customer's project (example)

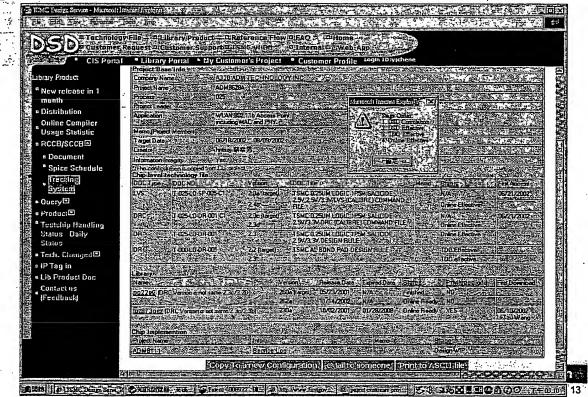


Contents of design profile (example)





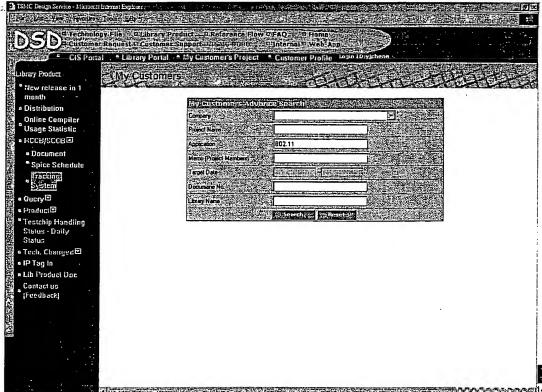
Outcome of auto-finder (example)





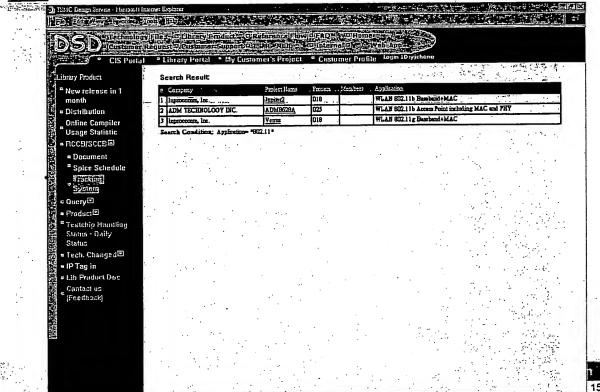
Search for experience sharing

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Experience found for reference (example)



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